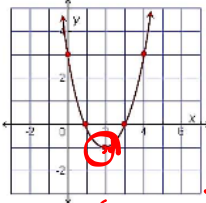
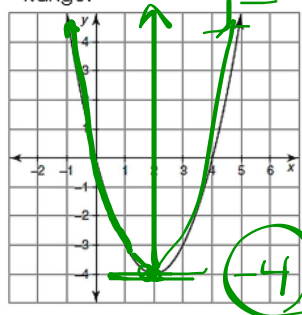
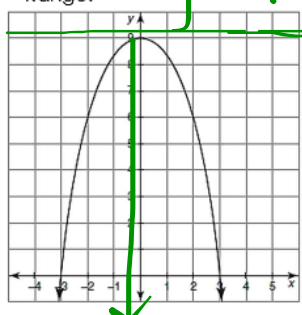
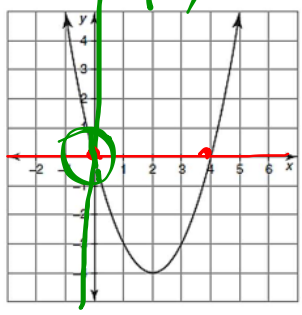
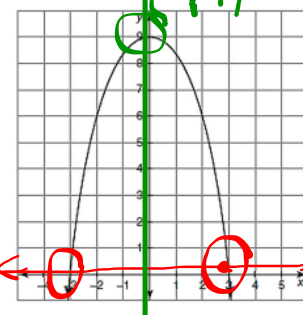
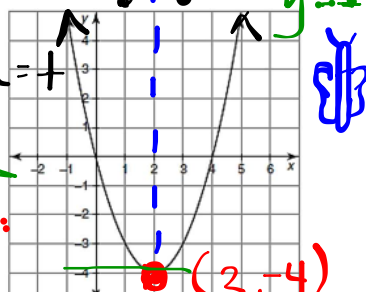
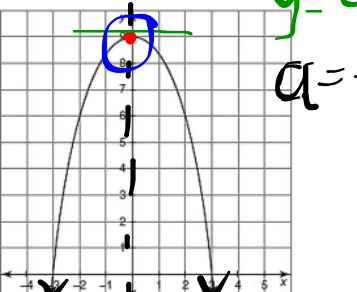
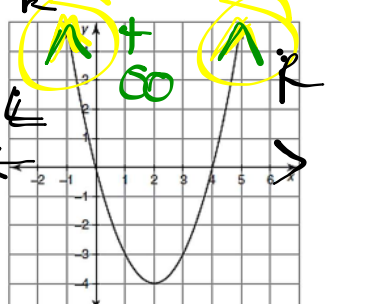
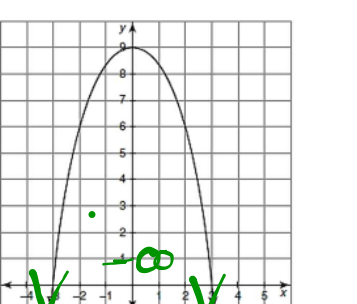
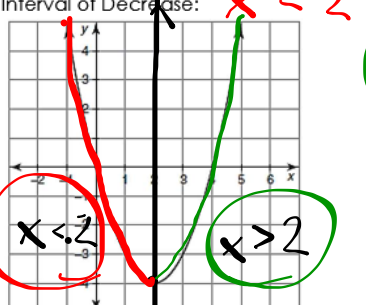
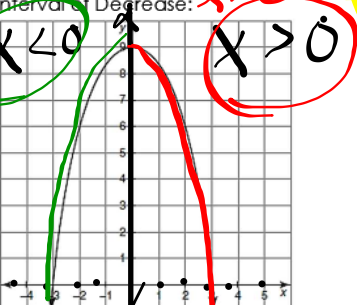
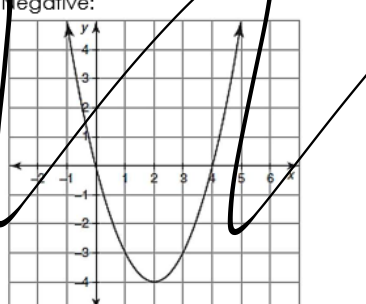
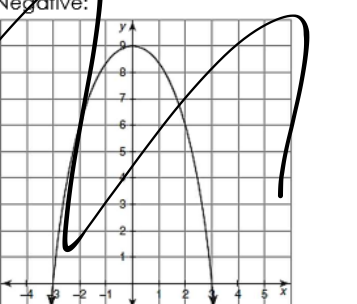



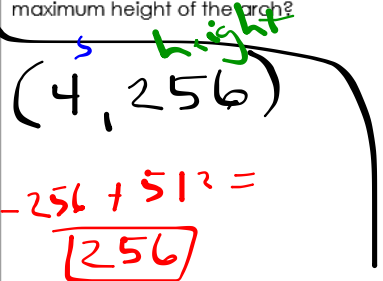
Unit 6: Quadratic Functions

Name: \_\_\_\_\_

Date: \_\_\_\_\_ Period: \_\_\_\_\_

What you need to know & be able to do	Things to remember	Examples	
1. Describe transformations from an equation or graph	$y = a(x - h)^2 + k$ a: stretches/shrinks & reflects h: shifts left & right k: shifts up & down  vertex: (h, k)	a. Describe the transformations and name the vertex: $y = -2(x + 3)^2 - 9$ $a = -2$ reflect $h = -3$ left 3 $k = -9$ down 9	a. Describe the transformations and name the vertex:  $h = 2$ right 2 $k = -1$ down 1 (2, -1)
2. Create a function using transformations	Determine your a, h, and k values $y = a(x - h)^2 + k$	a. Opens down, shifts up 3 units and shrinks by $\frac{1}{4}$ $a = -\frac{1}{4}$ $h = +3$ $y = -\frac{1}{4}x^2 + 3$	b. Shifts left 5 and reflects across the x-axis $h = -5$ $a = -$ $y = -(x + 5)^2$
3. Describe the domain and range.	-Domain: all possible values for x -Range: all possible values for y -"How far up or down does your graph go?" -written as an inequality	a. Domain: $\mathbb{R}$ Range: $y \geq -4$ 	b. Domain: $\mathbb{R}$ Range: $y \leq 9$ 
4. Describe the intercepts and zeros.	Zeros and x-intercepts are the same thing.  Zeros: x = X-int: (a, 0) (b, 0) Y-int: (0, c)	a. x-intercepts: (0, 0), (4, 0) → zeros: x = 0, x = 4 y-intercept: (0, 0) 	b. x-intercepts: (-3, 0), (3, 0) → zeros: x = -3, x = 3 y-intercept: (0, 9) 

<p>5. Describe the vertex, axis of symmetry, extrema, and min/max values.</p>	<p>Vertex: highest or lowest point</p> <p>Axis of Symmetry: x value of the vertex; written as <math>x =</math></p> <p>Extrema: Max or Min?</p> <p>Max/Min Value: What's the lowest or highest your graph goes; written as <math>y =</math></p>	<p>a. Vertex: <math>(2, -4)</math> Axis of Sym: <math>x = 2</math></p> <p>Extrema: <math>\text{min}</math> Max/Min Value: <math>y = -4</math></p> <p><math>a = +</math></p> 	<p>b. Vertex: <math>(0, 9)</math> Axis of Sym: <math>x = 0</math></p> <p>Extrema: <math>\text{max}</math> Max/Min Value: <math>y = 9</math></p> <p><math>a = -</math></p> 
<p>6. Describe the end behavior.</p>	<p>Which direction are the ends of the graph headed? To positive or negative infinity?</p>	<p>a. As <math>x \rightarrow -\infty, f(x) \rightarrow \infty</math> As <math>x \rightarrow \infty, f(x) \rightarrow \infty</math></p> 	<p>b. As <math>x \rightarrow -\infty, f(x) \rightarrow -\infty</math> As <math>x \rightarrow \infty, f(x) \rightarrow -\infty</math></p> 
<p>7. Describe the intervals of increase or decrease.</p>	<p>Draw your axis of symmetry and create an inequality to represent to the left and right of the axis of symmetry.</p> <p>Then determine which direction the graph is going on the left and then on the right using your inequalities.</p>	<p>a. Interval of Increase: <math>x &gt; 2</math></p> <p>Interval of Decrease: <math>x &lt; 2</math></p> 	<p>b. Interval of Increase: <math>x &lt; 0</math></p> <p>Interval of Decrease: <math>x &gt; 0</math></p> 
<p>8. Describe the positive and negative parts of the graph</p>	<p>Determine which parts of the graph are above or below the x-axis.</p> <p>Use inequalities to describe the different regions using the x-intercepts.</p>	<p>a. Positive:</p> <p>Negative:</p> 	<p>b. Positive:</p> <p>Negative:</p> 

<p>9. Applications of the Vertex</p>	<p>Maximum/Minimum indicate finding the vertex.</p> <p>Describe what you know about your equation before completing any solving.</p> <p>Interpret the vertex in terms of what x and y represent.</p> <p>a :</p> <p>b :</p> <p>c :</p> $x = \frac{-b}{2a}$	<p>a. The height in feet of a rocket after x second is given by <math>y = -16x^2 + 128x</math>. What is the <u>maximum height</u> reached by the rocket and <u>how long</u> does it take to reach that height?</p>  <p><math>y = -16x^2 + 128x</math></p> <p>a : -16    <math>x = \frac{-128}{2(-16)} = 4</math></p> <p>b : 128</p> <p>c : 0</p> <p><math>y = -16(4)^2 + 128(4)</math></p>	<p>b. The arch of bridge is modeled by the equation <math>y = -\frac{1}{4}(x - 50)^2 + 95</math>, where x represent the horizontal distance (in feet) and y represents the vertical distance (in feet). What is the maximum height of the arch?</p>  <p><math>(4, 256)</math></p> <p><math>-256 + 512 = 256</math></p>
		<p>c. A missile is launched along a path determined by the equation <math>f(x) = -2x^2 + 72x</math>, where f(x) is the height of the missile in feet x seconds after the launch. A plane is flying nearby at a height of 650 feet. Is the plane in danger? Why or why not?</p> <p><math>y = -2x^2 + 72x</math></p> <p>a : -2</p> <p>b : 72</p> <p>c : 0</p>	